

Better Ways to Frame a Deck



Smart details for ledgers, posts, and joists create a solid, attractive frame that should last as long as the house

BY JOHN SPIER

The wood frame of a deck leads a hard life. Without the protection of roof or walls, a deck frame is completely exposed to the weather. Though subjected to heavy loads, a wood deck is supported by just a few posts or piers instead of a solid foundation. And it's a rare homeowner who gives a second thought to maintaining a deck

once it has been built. In spite of all this, a deck is expected to be safe and attractive, and to last as long as the house that it's hanging from.

These goals aren't unreasonable if you pay attention to the details and materials that I'll explain in this article. Although the deck featured here is framed against a new addition, these details work equally well when



a new deck is added to an existing house.

Off to a good start

I've been building houses on Block Island, R.I., for almost 20 years, and unless otherwise requested, I frame decks with pressure-treated lumber, which stands up well to the rigors of weather. I use straight material free of major defects. For fasten-

ers, I prefer hot-dipped galvanized nails driven by hand. The deck ledgers attach with galvanized bolts and lags. I use gun-driven nails only to tack framing in place until permanent fasteners are installed, such as when nailing the spacers to the ledger.

Laying out and installing piers is an article all by itself, so I'll start with the assumption that the piers are in place (and in the



WATERPROOF FIRST

Adhesive-backed membrane applied to the wall sheathing protects the house by isolating the deck ledger. The membrane backing is scored carefully; a narrow strip left in place allows the housewrap to tuck underneath the membrane later (top photo).



The floor of the house determines the level of the deck, so one person measures down to the floor on the inside while another measures to the top of the framing (bottom photo). A snapped line guides ledger placement.

right place) with metal post bases installed. A quick check confirms these facts before I start.

Waterproof, then frame

Before the ledger goes on, I waterproof the house sheathing with an adhesive-backed membrane. I like to use Grace Ice & Water Shield (W.R. Grace & Co.; www.graceconstruction.com; 617-876-1400). The membrane goes on well above the top of the deck ledger and runs 6 in. or so past the end.

Above the deck, the housewrap has to overlap the membrane and flashing, but below the ledger, the membrane must overlap the housewrap. If the housewrap

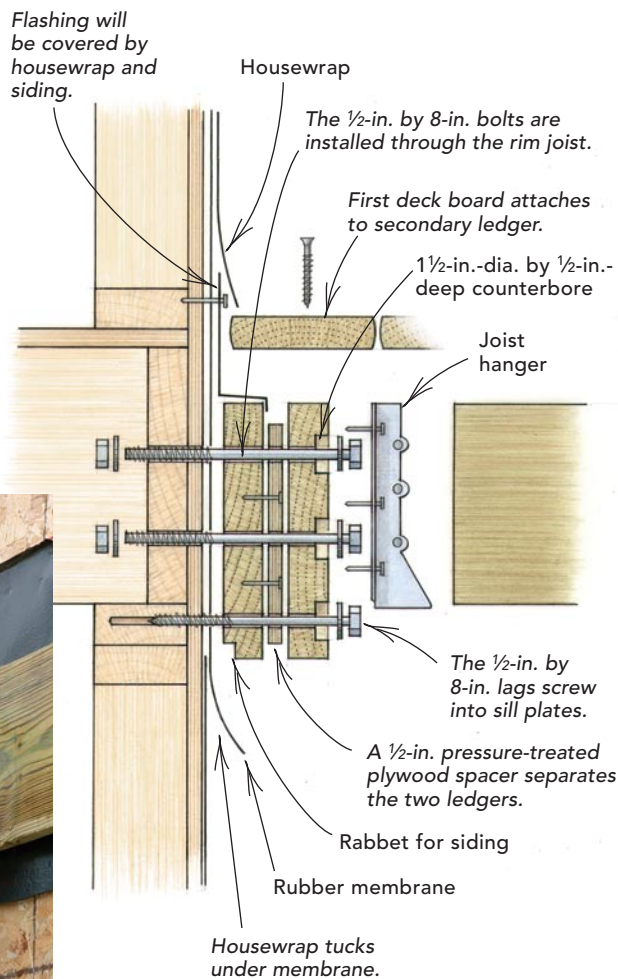
hasn't been installed (as in this case), I score the membrane's peel-off backing and leave about 3 in. along the bottom of the membrane so that the housewrap can be tucked under at a later date (top photo). A combination of careful detailing and high-quality flashing materials completes the waterproofing measures (drawing p. 52).

Two ledgers protect house and frame

The actual deck framing starts with a ledger securely fastened to the house. For decks less than 8 ft. wide, a single ledger may suffice, but for most decks, I prefer a double ledger that's fastened

INSTALL A TWO-LAYER LEDGER

A double ledger allows for a strong frame and an impenetrable flashing system that protects the house (drawing right). Nails hold the first ledger in place until the bolts and lags are installed later. The plywood spacers come next, made with pointed tips to shed water **1**. Before the secondary ledger is installed, counterbore holes for two bolts and a lag screw are drilled at each spacer location **2**. With the secondary ledger held in place by nails, one person bores through the framing members, and bolts attach the ledger assembly to the house **3**.



to the house with through-bolts and lag screws. The two-ledger system lets me attach the deck board nearest the house without perforating the flashing.

I establish a level line for the ledger based on the floor inside the house. Installing the deck 3 in. to 4 in. below the floor level keeps water and debris away from the door threshold and makes a comfortable step into the house. Holding a level in the window openings near each end of the deck, I measure down, make marks on the membrane (bottom photo, p. 51), and then snap a chalkline for the top of the primary ledger. A few nails hold this ledger in place until the bolts and the lags can be installed.

Pressure-treated plywood spacers separate the two ledgers (photos this page). I make the spacers about 3 in. wide and 1/2 in. shorter than the width of the ledger (9-in. spacers for 9 1/2-in.-wide 2x10 ledgers). The top of each spacer is pointed to shed water. I install the spacers 32 in. o.c. Because the spacer layout is also the layout for the bolts and lags, I plan for the spacers to fall between the deck joists and between the floor joists in the house. I tack the spacers to the first ledger with a couple of nails in opposite corners where I won't drill into them later.

The secondary ledger is laid out for both the bolts and the deck joists. Before the ledger goes up, I counterbore each through-bolt and lag location so that the washer and bolt stay below the surface of the ledger and away from any water running off the deck. The secondary ledger then nails to the first at every spacer, with just enough strategically placed nails to hold it in place until the bolts can be installed. At this point, I drill and insert one bolt in every other layout location to keep the led-

PREP THE POSTS

Leveling over from the ledger determines the length of the posts **1**. Instead of rolling each post to square the bottom, line up the framing square underneath the post and draw the line with the pencil out of sight **2**. Cut the top and bottom of the notch first, then plunge-cut along the edges **3**. A routed chamfer softens the edges of the 6x6 posts **4**.

gers in place while the rest of the framing process continues.

6x6 posts and a double rim joist add strength

Once the ledgers are installed, I turn to the posts that support the opposite side of the deck. The posts fit into metal post bases bolted to the piers. On occasion, I've used custom-fabricated stainless-steel bases, but I usually use Simpson Strong Tie ABU66 (800-999-5099; www.strongtie.com). The post bases provide a secure connection, so the piers hold the deck down as well as up.

A common choice for deck posts is 4x4 stock, but I prefer 6x6s, which can be notched to hold a double rim joist and still stay strong enough to support the deck railing (drawing p. 54). To get the length of the first post, I level over from the top of the ledger and measure down to the post base (photos this page).

After squaring the bottom of the post, I transfer the measurement to locate the notch. Corner posts are notched on two adjacent sides, while the notch runs along only one side of intermediate posts. I first cut the top and bottom of each notch at the proper depth. Then I plunge-cut the edges of the notch. A rap with a framing hammer knocks out the waste, and I clean up the corners with a sharp chisel.

While the posts are resting on sawhorses, I cut the tops, using the railing, trim, and framing



PRO TOOL

Longer level. I use this handy level in all phases of house framing. For deck framing, the level extends up to 13 ft., making it useful for plumbing tall posts or for leveling over from a ledger to a pier. **Extendable Level by Plumb-It** (800-759-9925; www.plumb-it.com); \$229.



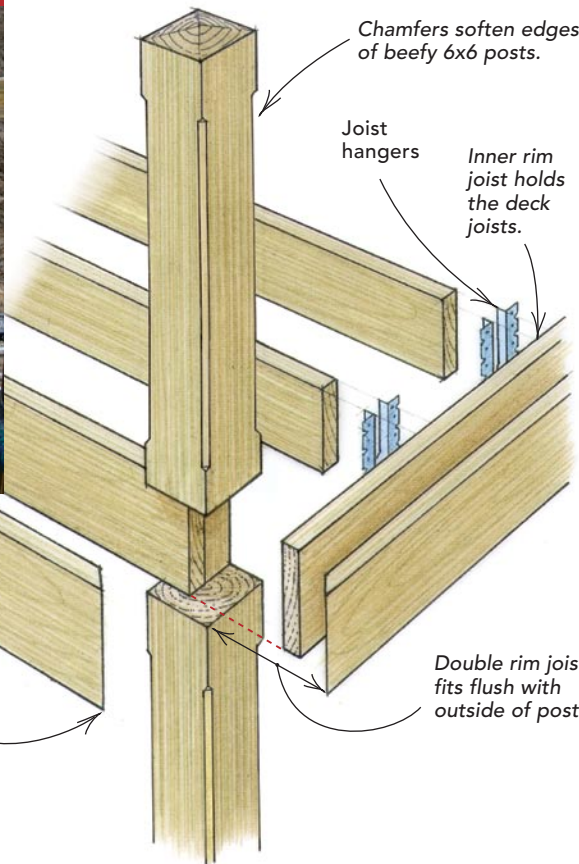
PRO TOOL

Bigger saw. My brother-in-law is a timber framer who works on our crew frequently. His big circular saw cuts to a 3¾-in. depth, which lets me work on 6x6 posts without having to dig out my handsaw. **Milwaukee 10¼-in. circular saw** (Part No. 6460; 800-729-3878; www.milwaukeetools.com); \$340.

SQUARE THE CORNERS



Notches in the 6x6 posts keep the double rim joists flush with the outside of the posts (drawing below). The first rim joist connects the corner post to the ledger and holds the post plumb **1**. After the joist is checked for level **2**, it is held square while a diagonal brace is nailed into place. Another rim joist helps to establish the opposite corner **3**, which is checked for square with a diagonal measurement and secured temporarily with a 2x4 brace **4**.



details to establish the length. Because 6x6 posts tend to look massive, I often soften the edges with routed chamfers.

Inner rim joists are installed first. Before setting the first post in place, I cut the inner rim joist for that end of the deck. The rim joist attaches to the double ledger at the house and slips into the notch on the corner post (photos this page). After starting a few nails to hold the rim joist in place, I adjust the post base until the post is plumb in both directions. When I'm satisfied, I drive the nails home. Then I square the rim joist to the ledger using a large measured triangle, such as a 6-8-10, and brace it in position.

With the first post braced plumb and square, I move to the post on the opposite corner of the deck. I connect the first corner post to the opposite corner post with a long 2x10 for the inner rim joist. This rim joist holds the post plumb in one direction, while a regular joist keeps it plumb in the other direction.

This is a good place to explain that this deck wraps around the addition with 45° corners, so instead of framing for a 90° corner with a single post, I used two posts to form the 45° angle. I modified the notches for these posts to hold the 45° rim joist.

For the intermediate post between the corner posts, I simply measure down from the rim joist to the post base for the height of the notch. If the distance between posts cannot be spanned with a single length of framing, I stretch a taut string between the posts and measure down. As each intermediate post slips into place, I install a regular joist nearby to hold the rim joist straight and the post plumb.

Joists are nailed twice

If the outside walls of the house are relatively straight and the corner posts are the same distance

PRO TOOL



Accurate nailer. The most tedious part of deck building is putting in joist hangers. On the first job, the Paslode nailer paid for itself in time saved. Boredom relief was a bonus. **Paslode Positive Placement Framing Nailer** (Part No. 5250PP; 800-222-6990; www.paslode.com); \$485.

FINISH THE FRAME

With the inner rim joist set around the perimeter, the tops of the deck joists align with the rim, and nails through the rim hold them in place until the hangers can be installed **1**. The ledger end of each joist is toenailed. For this deck, the outer rim joist is the finished face, so the best-looking stock is used. Mitered corners create a more finished look **2**.



PRO TOOL



Faster wrench. Whenever I have a lot of lags to drive, my impact wrench comes to the rescue of my bruised knuckles. **Porter-Cable 1/2-in. pneumatic impact wrench** (Part No. PT502; 800-321-9443; www.porter-cable.com); less than \$100.



from the house, I cut all the deck joists to the same length. I reject stock that's excessively crowned or bowed. I mark crowns on all the joists and set them where they can be accessed easily.

Joists have to be installed with proper hangers, and in an ideal world, you would set the hangers first, drop in the joists, and nail them off. But even the best grades of framing material vary too much in width for this approach. So I nail the joists in place first and then install the hangers. Following those steps keeps the tops of the joists

aligned properly with the tops of the ledger and rim joists. With just the inner rim joist in place, I can drive nails directly into the joists to secure them. A toenail on each side holds each joist in place at the ledger end.

Once the joists are in place, I check the posts with a level, casting an eye along the perimeter to make sure everything is straight. Then one crew member tacks the hangers in place with the integral tabs on them; another follows with a pneumatic positive-placement nailer. We finish installing the ledger by drilling

and driving through-bolts and lags. If the deck is large, I break out an automotive pneumatic nut driver, which makes quick work of the bolts and lags.

The last step is installing the outer rim joist. For the strongest assembly, I offset any butt joints from the joints in the inner rim joist. On this deck, the outer rim joist was also the finished surface, so I chose the nicest-looking stock and mitered the corners for a more finished look (photo right).

Although the frame is now ready for the decking, I often cover the joists with plywood while the project is under way. As with the finished floors inside, I try to install the decking after the heaviest work has been done to keep it looking nice. □

John Spier and his wife, Kerri, own Spier Construction, a custom-home building company on Block Island, R.I. Photos by Roe A. Osborn.